Jon A. Franke
Site Vice President

Susquehanna Nuclear, LLC
769 Salem Boulevard
Berwick, PA 18603
Tel. 570.542.2904 Fax 570.542.1504
Jon.Franke@talenenergy.com

TALEN ENERGY

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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

10 CFR 50.73

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 50-387/2015-007-00
UNIT 1 LICENSE NO. NPF-14 **Docket No. 50-387**
PLA-7429

Attached is Licensee Event Report (LER) 50-387/2015-007-00. The LER reports an event in which the Unit 1 'B' Inboard Main Steam Isolation Valve (HV141F022B) closed during a planned surveillance test which caused a SCRAM on Unit 1. This event was determined to be reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a condition that resulted in a system actuation of the reactor protection system (RPS).

There were no actual consequences to the health and safety of the public as a result of this event.

This letter contains no new regulatory commitments.

J. A. Franke

Attachment: LER 50-387/2015-007-00

Copy: NRC Region I
Mr. J. E. Greives, NRC Sr. Resident Inspector
Mr. M. Shields, PA DEP/BRP
MS. T. E. Hood, NRC Project Manager

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Susquehanna Steam Electric Station Unit 1	05000387	1 OF 3

4. TITLE Unit 1 'B' Inboard Main Steam Isolation Valve, HV141F022B closed during surveillance test which caused a SCRAM on Unit 1

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
11	12	2015	2015	-007	-00	01	08	2016	FACILITY NAME	DOCKET NUMBER 05000

9. OEPRATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
10. POWER LEVEL	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
098	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMER *(Include Area Code)*
Nicole Pagliaro Licensing Specialist- Nuclear Regulatory Affairs	570-542-6578

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	JC	SOL	A613	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On 11/12/2015 at 1132 hours, the Unit 1 'B' Inboard Main Steam Isolation Valve, HV141F022B, closed during the performance of SI-183-207, Quarterly Functional Test of Main Steam Line 'C' Flow Channels FIS-B21-1N008A&B and Main Steam Line 'D' Flow Channels FIS-B21-1N009A&B. This resulted in an automatic SCRAM of Unit 1 on high reactor pressure.

This event was reported under 10 CFR 50.72(b)(2)(iv)(B) and 10CFR 50.72(b)(3)(iv)(A) per the guidance of NUREG 1022, Revision 3, Section 3.2.6 . This event is also being reported as a Licensee Event Report (LER) in accordance with 10 CFR 50.73(a)(2)(iv)(A).

The root cause is that the station did not evaluate recommendations made in 2011 by the Boiling Water Reactor Owners Group Instrument and Controls (BWROG I&C) Maintenance Committee to mitigate Primary Containment Isolation System (PCIS) Group 1 Surveillance Testing Risk. It was also determined as a causal factor that there was not specific guidance contained in SI-183-306 (24 Month Calibration Main Steam C/D) which led to an inaccurate field decision when determining the cause of the extinguished light.

Planned corrective actions include evaluating the BWROG I&C Maintenance Committee Recommendation to mitigate PCIS Group 1 Surveillance Testing Risk and then design and implement the proposed modification. Additionally, I&C personnel will perform a review of the population of BWROG recommendations that were issued between January 2011 and December 2013 to ensure they were evaluated.

There were no actual consequences to the health and safety of the public as a result of this event.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Susquehanna Steam Electric Station Unit 1	05000387	2015	- 007	- 00	2 OF 3

NARRATIVE

CONDITIONS PRIOR TO EVENT

Unit 1 – Mode 1, 98 percent Rated Thermal Power

There were no structures, systems, or components that were inoperable at the start of the events that contributed to the event.

BACKGROUND
Main Steam Isolation Valves (MSIVs) are held in the OPEN position by one AC solenoid and one DC solenoid. To have a closure of an MSIV, both of the solenoids would need to become de-energized. The surveillance testing that was being performed at the time of the SCRAM was, by design, creating a 1/2 isolation on the AC solenoid (de-energized). If a failure of either the AC or DC solenoids were to occur while the other channel has been de-energized, the MSIV would fast-close, resulting in an automatic SCRAM due to plant transient.

EVENT DESCRIPTION

On 11/12/2015 Maintenance was scheduled to perform a quarterly functional test of 'C' and 'D' Main Steam Flow Channels. Current through the DC solenoids was read with an ammeter at a value of 58 maDC. Per the procedure, which states "approximately 50 maDC," this was an acceptable value. At 1132 hours the crew raised the test pressure on FIS-B21-1N008A to obtain AC channel trip. According to personnel statement forms and operations logs, after 3-5 seconds of increased pressure the 'B' inboard MSIV closed, resulting in an automatic SCRAM of Unit 1.

Below is a series of events that led up to the SCRAM:

06/08/2015- Successfully performed surveillance 1907860 24 Month Calibration of MSIV flow channels
08/13/2015- SI-183-207, Quarterly Functional Test of Main Steam Line C Flow Channels A/B was successfully performed with no issues.
11/06/2015- The Direct Current continuity lights, which are on each MSIV for monitoring, are found out on the Main Steam Isolation valves and control. Operations replaced the bulbs but they still did not work.
11/09/2015- A work order is generated to replace the Sector Gear on Unit 1 Channel 'C' Main Steam Line High Flow Switches
11/09/2015- The 24 Month Calibration of Main Steam Line 'C' Flow Channels FIS-B21 and 'D' Flow Channels are successfully performed.
11/09/2015- Electrical Maintenance verified the DC operability by observing the current approximately 40 Milliamps across the coil.
11/10/2015- A work order was generated to perform troubleshooting.
11/12/2015 at 1100- Maintenance performed SI-183-207(Quarterly Functional Test of C&D Flow Channels).
1132- The crew raised the test pressure on FIS-B21-1N008A to obtain AC channel trip
1132- Automatic scram of unit 1 on high reactor pressure

CAUSE OF EVENT

The direct cause of the event was an undetected failure of a solenoid assembly located on the 1B inboard MSIV as indicated by a measured resistance of 8 Megaohms. A report from Exelon Labs determined that the 1 B inboard MSIV solenoid assembly failed due to a burned open magnet wire at the soldered lead wire connection.

The root cause is that the station did not evaluate recommendations made in 2011 by the BWROG I&C Maintenance Committee to mitigate PCIS Group 1 Surveillance Testing Risk. While I&C Maintenance did review the owners group recommendations made in 2014, the review resulted in no action being taken. It was also determined as a causal factor

that there was not specific guidance contained in SI-183-306 (24 Month Calibration Main Steam C/D), which led to an inaccurate field decision when determining the cause of the extinguished light. The specified value that was obtained during troubleshooting was 40 maDC. The calculated resistance on that measurement was 88% above the vendor recommended specifications for expected resistance. The procedure allowed for interpretation of a value that did not have margin.

ANALYSIS/SAFETY SIGNIFICANCE

There were no actual consequences of this event. Unit 1 automatically shut down based on the designed activation of the safety features that are a part of the Reactor Protection System (RPS). The Unit 1 risk significance and potential consequences for the initiating event was less than 1E-6 for Core Damage Probability (CDP) significance threshold and less than 1E-7 for the Large Early Release Probability (LERP) significance threshold as outlined in NRC Inspection Manual Chapter (IMC) 0609. These thresholds represent a GREEN significance level and are of "Very Low Safety Significance".

CORRECTIVE ACTIONS

1. Evaluate the BWROG I&C Maintenance Committee Recommendation to mitigate PCIS Group 1 Surveillance Testing Risk.
2. Design and implement one of the proposed modifications from the BWROG.
3. Using the newly developed template for performing MSIV Surveillance Testing, revise the population of procedures included in the extent of condition.
4. Determine a conservative current reading through the MSIV's DC pilot solenoids for the I&C surveillance procedures.
5. Identify and review the population of BWROG recommendations that were issued between January 2011 and December 2013 to ensure they have been reviewed.

COMPONENT FAILURE INFORMATION

The 1B Inboard MSIV solenoid assembly failed due to a burned open magnet wire at the soldered lead wire connection. Although a contributing factor could not be identified, Exelon Labs stated that this is a common failure location due to either tool indentations and/or mechanical stress during fabrication.

PREVIOUS SIMILAR EVENTS

No other similar events were identified.